

NON-PUBLIC?: N
ACCESSION #: 8711100481
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Vermont Yankee Nuclear Power Station PAGE: 1 of 4

DOCKET NUMBER: 05000271

TITLE: Loss of Normal Power During Shutdown Due to Routing All Off-Site Power
Sources Through One Breaker
EVENT DATE: 08/17/87 LER #: 87-008-01 REPORT DATE: 11/04/87

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: James P. Pelletier, Plant Manager TELEPHONE #: 802-257-7711

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: KP COMPONENT: PSP MANUFACTURER: X999
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At approximately 1400 hours on 8/17/87 while the plant was in a refueling outage and all off-site power was being routed through one set of breakers, an interruption on the grid caused the plant to lose normal power supplies. The Emergency Diesel Generators (EDG) responded as required as did other engineered safety systems. When the EDG's started, they were able to supply power to all necessary systems. Three pumps that started immediately after the EDG's were 2 service water pumps and the electric fire pump. The starting of these three pumps, in addition to the diesel driven fire pump caused a pressure surge which ruptured a temporary piping system fabricated from 2" schedule 80 PVC piping (EHS = KP). The PVC piping was made by ESLON.

The ruptured pipe spilled about 2000 gallons of river water onto the Refueling Floor of the Reactor Building. As a result of the spill, this water was communicated through the floor drain system which resulted in contaminating local areas of the Reactor Building. Minor seepages through the interface between the Reactor Building Refuel Floor Paneling and the Reactor Building exterior walls were detected. No equipment was damaged as a result of the spill.

Precautions will be added to procedures to warn against the routing of all sources of outside power through a single set of breakers. Engineering will ensure that future mechanical bypasses consider the potential for pressure surge.

(End of Abstract)

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DESCRIPTION OF EVENTS

At approximately 1400 hours on 8/17/87, the plant suffered a Loss of Normal Power (LNP). At that time the facility was shutdown for a refueling outage. The Startup Transformers had been taken out of service in order that Double Testing could be performed on them. One of the plant's two main output breakers, had also been taken out of service for Double Testing. This action caused all sources of off-site power to be routed through one set of breakers.

At 1400 hours a line fault, external to the plant, was transmitted down one of the power lines supplying plant power. This fault, which also caused trips at other facilities in the area, caused the second of the plants main output breakers to open. The plant was now isolated from all sources of outside power.

When the second main breaker opened the following events occurred as would be expected:

- a) A SCRAM signal resulted from a loss of power to the Reactor Protection System (RPS),
- b) the Primary Containment Isolation System (PCIS) caused the reactor isolation valves to close, Group I valves,
- c) the PCIS caused the Reactor Building Ventilation Valves, Group III valves, to close as a result of loss of logic power,
- d) the PCIS caused the shutdown cooling valves, Group IV valves, to go closed as a result of loss of logic power,
- e) the PCIS caused the Reactor Clean-up Valves, Group V, to close as a result of loss of logic power,
- f) there was a temporary loss of both the Service Water Pumps and the Residual Heat Removal (RHR) system pumps, being used for shutdown cooling.
- g) the diesel fire pump auto started on loss of pressure in the Fire Protection System and the Service Water System headers, and
- h) the Emergency Diesel Generators started as a result of the LNP.

When the Emergency Diesel Generators started, within 13 seconds of the LNP, power was available to auto start the following equipment:

- a) the RHR pumps and the Service Water pumps being used for shutdown cooling,
- b) the PCIS logics for Groups I, III, IV, and V thus permitting the isolated systems to be un-isolated, and
- c) the electric fire pump auto started due to low header pressure in the Service Water and Fire Protector headers.

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DESCRIPTION OF EVENT (Cont.)

A temporary piping system connecting the service water system and the fire protection system burst shortly after the start of the Emergency Diesel Generators. As a result of the pipe break about 2000 gallons of river water were spilled onto the refueling floor of the Reactor Building. As a result of the spill, this water was communicated through the floor drain system which resulted in contaminating local areas of the Reactor Building. The cause of the bursting of the pipe is believed to have been as a result of the near simultaneous starting of the service water pumps and the electric fire pump coupled with partial service water system drainage during the event. The temporary piping connection was made from 2" schedule 80 PVC piping. The piping was manufactured by ESLON.

The temporary piping system had been designed and an engineering review of the system had been performed. The design of the system had taken into consideration normal system operating conditions. A review of the proposed system for pressure surge was not required, therefore no such review was performed. The piping system, designed for system of pressures of about 150 psig, is suspected to have been subjected to a larger than normal pressures surge when the pumps regained power after the Emergency Diesel Generators started.

As a result of the burst pipe, approximately 2000 gallons of clean service water were spilled onto the Refueling Floor of the Reactor Building. The water immediately entered the floor drain system in the Reactor Building. The floor drain system contains several contaminated lengths of pipe which in turn contaminated the service water. The rate of flow of the water from the burst pipe greatly exceeded the capacity of the floor drain system. The draining water overflowed the floor drain sump on the lowest level of the Reactor Building, and vented out several floor drains on two additional floors of the building. Water temporarily pooling on the Refueling Floor was also seeped through the interface between the Reactor Building Refueling Floor paneling and the Reactor Building's exterior walls.

A test of secondary containment was conducted as part of the cleanup and

investigation after the event. Containment was found to be intact. An area walked-down was conducted of the various levels of the Reactor Building. It was determined that there had not been any damage to equipment as a result of the spill.

CAUSES OF EVENTS

The immediate cause of the LNP was an external line fault of unknown origin on the grid while the plant was in a shutdown condition. However, the root cause of the LNP was the routing of all sources of off-site power through one set of breakers while the plant was in an outage.

The cause of the burst pipe is the result of a water surge in the Service Water System and Fire Protection System as a result of multiple simultaneous pump starts in those systems. The root cause of the broken pipe is the failure of the design review to be required to review the installation for a pressure surge.

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ANALYSIS OF EVENTS

The events of this report did not have adverse safety implications. During the events of the LNP:

- a) The RPS responded as designed.
- b) The PCIS responded as designed.
- c) The Emergency Diesel Generators responded as designed.
- f) Operators responded as required by procedure.

After the LNP:

- a) The operators were able to isolate the pipe break, in about 10 minutes, using procedures outlined in the mechanical bypass.
- b) An area walk-down did not detect any equipment damage as a result of the events of this report.
- c) Cleanup of the spill commenced about 30 minutes after the pipe break and was completed in about 14 hours.

Had these events occurred at full power, in addition to the equipment available for this transient both of the startup transformers would normally be available to supply power to plant equipment.

During the transient, if both Emergency Diesels had failed to start, power would still have been available through the 5 Megawatt tie line to the Vernon Dam. This is sufficient power to operate essential plant equipment. This

power source would be available to the plant within 2 minutes.

No similar events have occurred within the past 5 years.

CORRECTIVE ACTIONS

Precautions will be added to procedures to warn against the routing of all sources of outside power through a single set of breakers.

Engineering personnel will be instructed to, in the future, consider in their reviews of temporary piping systems the potential for pressure surges.

ATTACHMENT # 1 TO ANO # 8711100481 PAGE: 1 of 1

VERMONT YANKEE NUCLEAR POWER CORPORATION

P.O. BOX 157
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November 4, 1987

VYV 87-236

U.S. Nuclear Regulatory Commission
Document No. 50-271
Washington, D.C. 20555

REFERENCE: Operating License DPR-28
Docket No. 50-271
Reportable Occurrence No. LER 87-08, Rev. 1

Dear Sirs:

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 87-08, Rev. 1.

This revision adds the "power level" (item 10) which was left blank to read "000" and includes a correction in the Analysis of Events, LNP, line b, to read as follows: b) An area walk-down did not detect any equipment damage as a result of the events of this report.

No other changes have been made in this revision.

Very truly yours,

VERMONT YANKEE NUCLEAR
POWER CORPORATION

/s/ James P. Pelletier
James P. Pelletier
Plant Manager

cc: Regional Administrator
USNRC Office of Inspection and Enforcement
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King of Prussia, Pennsylvania 19406

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